



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

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For: ROTOGRAVURE COATED PAPERS

Patent Art Unit: 1794

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DECLARATION UNDER 37 CFR 1.132

Hon. Commissioner of Patents and Trademarks

Washington, D.C. 20231

Sir:

I, Koji OKOMORI, the demonstrator of this experiment, a citizen of Japan, working for Nippon Paper Industries, Co., Ltd. at 5-21, Pulp and Paper Research Laboratory of 21-1, Oji 5-chome, Kita-ku, Tokyo, 114-0002 Japan, Do hereby declare that:

I graduated from The University of Tokyo, majoring in biomaterial Science; I also majored in chemical engineering at the University of Maine as a visiting scientist. I earned a Master of Science degree at the University of Tokyo in forest products in 1993 and earned a Ph.D. at The University of Tokyo in 2001 in biomaterial Science. I have been in charge of research on coated paper since 1993 at Nippon Paper Industries, Co., Ltd. My position at the company is a Research Manager of Pulp and Paper Research Laboratory, in R&D Division.

Makeup test was conducted on Example 1 of JP 2002-88679 A (referred to as "Kai" hereinafter) except for the following conditions:

- (1) Coating speed 1,000 m/min. was used in place of 500 m/min.
- (2) Roll temperature 70°C was used in place of 65°C in calendaring step.
- (3) A linear calender pressure of 200 kg/cm was used in place of 150 kg/cm.

[Experimental test]

Preparation of coating color

0.2 parts by weight of sodium polyacrylate as a dispersant was added to a mixture of pigments of 80 parts of engineered kaolin (ECLIPS650 available from Engelhard Corporation, volume distribution in the particle diameter range of 0.40-4.20 µm: 66.0 %) and 20 parts of fine-grained ground calcium carbonate (FMT-90 available from Fimatec Ltd., volume distribution in the particle diameter range of 0.40-4.20 µm: 71.9 %) to prepare a pigment slurry having a solid content concentration of 70%. 0.2 parts by weight of non-associated synthetic acrylic water retention agent, 6 parts by weight of styrene-butadiene latex copolymer A having glass transition temperature of -40 °C for use in gravure printing

and water were added to the pigment slurry to prepare a coating color having a solid content concentration of 63%.

#### Base paper

A mechanical paper having a basis weight of 42 g/m<sup>2</sup> was used as a coating base paper, containing 6 % of talc as a filler based on the weight of the base paper and 30 % by weight of a mechanical pulp as papermaking pulp.

#### Production of a coated paper

The base paper was coated with the coating color on both sides at a coating amount of 12 g/m<sup>2</sup> per side using a blade coater at a coating speed of 1,100 m/min.

#### Calender

The coated paper was passed through a supercalender with two nips at a roll temperature of 70 °C, a linear calender pressure of 200 kg/cm, and a paper feed speed of 10 m/min to give a rotogravure coated paper.

The results are shown in Table 1.

The result of Examples 1-4 and Comparative Examples 1-4 in Table 1 correspond to Examples 1-4 and Comparative Examples 1-4 of the present invention, respectively.

Table 1

	Density g/cm <sup>3</sup>	Sheet gloss %	Print gloss %	Missing dots	Stiffness	Opacity	Coatability
Example 1	1.05	75	90	⊙	⊙	⊙	⊙
Example 2	1.12	78	95	⊙	○	○	⊙
Example 3	1.03	77	93	○	⊙	⊙	○
Example 4	1.05	74	89	⊙	⊙	⊙	○
Comparative example 1	1.07	64	78	△	⊙	⊙	x
Comparative example 2	1.04	68	83	△	⊙	⊙	x
Comparative example 3	1.16	68	84	○	○	○	⊙
Comparative example 4	1.15	64	80	⊙	x	x	△
Experimental test 1	1.16	68	81	○	x	x	○

<Evaluation methods>

(1) Volume distribution for mean particle diameter: determined using a laser diffraction-based particle size distribution analyzer available from MALVERN Instruments.

(2) Sheet gloss: determined according to JIS P 8142.

(3) Print gloss: determined according to JIS P 8142 on the surface of a print obtained by using a single-color rotogravure press of the type used for printing paper currency approved by the Ministry of Finance of the Japanese Government, at a printing speed of 40 m/min and a printing pressure of 10 kgf/cm.

(4) Missing dots: visually evaluated on the coated paper bearing an image after printing by the single-color rotogravure printing process described above. ◎: very good.

○: good, △: slightly poor, \*: poor.

(5) Stiffness: determined according to JIS P 8143 and evaluated on the following criteria. ◎: very good, ○: good, △: slightly poor, \*: poor.

(6) Opacity: determined according to JIS P 8138 and evaluated on the following criteria. ◎: very good, ○: good, △: slightly poor, \*: poor.

(7) Coatability: determined on the basis of streaks, scratches and the flowability of the coating solution during blade coating and evaluated on the following criteria. ◎: very good, ○: good, △: slightly poor, \*: poor.

Conclusion

I declare that the results of the above experiment reveal the following:

(1) The density of the coated paper produced by the method of Experimental Test 1 is high, since the coated paper does not contain hydrated sodium aluminum silicate as in Example 1 of the present invention.

(2) The sheet gross is low, since the coated paper does not contain plastic pigment.

(3) The print gross of the coated paper produced by the method of Experimental Test 1 is inferior to those of Examples 1-4. The print gross of Experimental Test 1 differs from that of Comparative Example 1 because of the printing conditions.

(4) The stiffness of the coated paper produced by the method of Experimental Test 1 is low since the density of the base paper is high.

(5) The opacity of the coated paper produced by the method of Experimental Test 1 is low since the density of the base paper is high.

Estimation of Experimental Test 1

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United State Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

**Koji Okomori**

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